volume, pp. 401–416), which is taking effective shape in the organization of associations of teachers of mathematics throughout the country. On April 11–12 the Central Association of Teachers of Mathematics and Science was formed at Chicago, Professor Moore and other members of the society actively cooperating. At a meeting held in Boston on April 18 the Association of Teachers of Mathematics in New England was organized. This meeting was opened by an address, by President Thomas S. Fiske of the society, on 'Methods for improving the teaching of mathematics.' Other similar associations will probably soon be formed. It is precisely through such associations that the society can best exert a real influence on the teaching of mathematics.

The following papers were read at the April meeting:

H. E. HAWKES: 'On non-quaternion number systems in seven units.'

B. O. PEIRCE: 'On families of curves which are the lines of certain plane vectors, either solenoidal or lamellar.'

E. W. BROWN: 'On the variation of the arbitrary and given constants in dynamical equations.'

L. P. EISENHART: 'Congruences of tangents to a surface, and derived congruences.'

H. F. STECKER: 'Least distance in the non-euclidean plane.'

L. E. DICKSON: 'Fields whose elements are linear differential equations.'

SAUL EPSTEEN: 'On linear differential congruences.'

R. S. WOODWARD: 'The deviation from the vertical of falling bodies.'

EDWARD KASNER: 'The automorphic groups of the manifolds defined by a general and a symmetric determinant.'

C. H. SISAM: 'On some directrix curves on quintic scrolls.'

L. I. NEIKIRK: 'Groups of order p^m which contain cyclic subgroups of order p^{m-3}.'

I. M. SCHOTTENFELS: 'On the simple groups of order 8!/2.'

E. B. WILSON: 'The so-called foundations of geometry.'

The American Physical Society was in session simultaneously with the Mathematical Society. While it was found impracticable to arrange a joint session, several members of the Physical Society attended the presentation of Professor R. S. Woodward's paper. In the evening twenty-five members of the two societies dined together and continued the discussion of the outlook for the better teaching of mathematics, a topic of mutual interest and importance.

The next meeting of the Mathematical Society will be the summer meeting, which, with the Fourth Colloquium, will be held at the Massachusetts Institute of Technology, Boston, beginning August 31. F. N. COLE,

Secretary.

DISCUSSION AND CORRESPONDENCE.

THE PROPOSED BIOLOGICAL LABORATORY AT THE TORTUGAS.

THE need of a first-class marine laboratory for research in the tropical Atlantic is so apparent and so pressing that I hope that no apology is necessary for a few practical suggestions that are the result of a personal acquaintance with the station that seems, from the replies to Dr. Mayer's enquiries, to be the one most favored by the zoologists who have been consulted. Without any intention of belittling the claims of any other situation, there are certain important advantages that can be urged in favor of the Tortugas that seem to render this station far and away the most advantageous for the best work along marine biological lines. These may be summarized as follows:

1. The unexcelled fauna. It seems to me that there is hardly a doubt that at no point in the vicinity of our southern coast are the conditions more favorable for profuse marine life than here. Some years ago an expedition from the University of Iowa examined with some care several regions in the West Indies and Florida keys, including the island of Eleuthera, Cuba, Key West and the Tortugas. While any one of these stations would afford abundant material for investigation, the preeminence can confidently be claimed for the last of these points. As asserted by Dr. Mayer, the northern edge of the Gulf Stream seems to very materially excel the southern, especially in the matter of pelagic life.

The extensive reefs and flats abound in almost all groups of marine invertebrates that belong to the West Indian fauna, and are easily accessible from Garden Key, where the proposed station would logically be placed.

2. The unusual purity of the water. This is a condition that will appeal to any one who has had much experience with marine work. There being no city or even town in the immediate neighborhood is a decided advantage from this standpoint. Even at Naples, which is now probably the best station in the world, there are many forms that are not successfully kept for any length of time in the aquaria. When the writer was at Plymouth, England, some years ago, the water, although apparently pure, was the cause of much perplexity and discouragement. At the Woods Hole laboratories the condition is even worse, and many problems have to be abandoned that could be solved with the aid of such water as could easily be secured at the Tortugas. While it may be claimed that equally pure water could be obtained at other points in the West Indies, I know of no place where it would be so easily introduced into a laboratory. The ship channel runs right by the old quarantine station on Garden Key, and practically no piping would be necessary to utilize it for laboratory purposes.

3. By far the largest and best stocked aquarium in the world is already established there in the form of the old moat that was of course originally designed to serve quite different purposes. This moat is protected by a solid wall of masonry that at the time of our visit was practically intact and good to serve for many years. The opposite side of the moat is the solid wall of old Fort Jefferson. I do not remember the width of the moat, but it must be at least thirty yards, judging from a photograph taken by myself. It is from three to six feet deep, the water is changed at every tide, and its surface is always quiet, except when an unusually heavy storm throws the spray over the outer wall. Here are conditions such as can nowhere else be found. During nearly half a century this moat has been practically undisturbed by man, and has been populated with an extremely rich fauna of its own. Here many species of marine animals and plants can be watched daily and hourly, if need be, throughout their lives, and under perfectly natural conditions. Portions of the moat could easily be divided off for particular purposes by the use of wire screens. The breeding and development of many species could be carried on under scientific control, and the results would not be vitiated by the objections so constantly raised concerning the unnatural conditions of many of the present laboratory experiments.

4. Nearness to the Pourtales Plateau. This submarine shelf made famous by the wonderful results of the dredging done by the *Blake* and other vessels lies within easy reach of the Tortugas. This would give an excellent opportunity to investigate forms of a comparatively deep-water zone in a region probably unexcelled in richness of fauna by any other in the western hemisphere.

It is improbable that deep-water work is contemplated by those having charge of the movement for a laboratory in this region, but there is no reason why excellent work should not be done in this direction. We were perfectly successful in dredging on the plateau with a small schooner, with iron rope and an ordinary windlass worked by hand power. Indeed, it was here that we met with our best success.

5. An abundance of building material. This is already on the spot and could doubtless be secured for scientific purposes without any cost whatever. Fort Jefferson was originally one of the most extensive fortifications in the United States, but it is now crumbling into ruins. Some parts of the buildings could doubtless be repaired at little cost to serve the purposes of the station, and there are millions of brick and quantities of stone that are serving no purpose whatever. I understand that all this is now in the hands of the U. S. Army, but it could surely be secured for such a purpose as is contemplated if the matter were fairly presented to the proper authorities.

Another very important matter in this connection is the large supply of excellent drinking water stored away in the immense cis-

terns, originally intended to serve for a supply for thousands of men. Any one who has worked in tropical regions will appreciate what it means to have abundant fresh water that is good and sweet and cool. This, together with the absence of mosquitoes, would be a very forceful argument in favor of the Tortugas with naturalists of experience in warm regions.

Of course it is possible that some of the conditions have changed since the writer visited the Tortugas. For instance, the moat may have become partly filled up, or the channel may have changed so as to block the way to the old quarantine building. But it does not seem likely that conditions are greatly different from those described above, or that the changes are such as materially to modify the advantages of that locality for a marine biological laboratory. It has been my purpose to mention particularly certain advantages that would not occur to one not acquainted with the local situation, and it appears to me that these considerations are of unusual weight in the present case.

Taking into consideration the whole body of American workers that could use such a station to advantage, it can hardly be said that the Tortugas are less accessible than the other localities suggested in the letters published by Dr. Mayer, *i. e.*, the Bermudas or Jamaica. For those living in the central or western states the Tortugas are more accessible than either of these. Of course if a station were established at the Tortugas, it should possess its own means of transferring workers and supplies to the mainland.

C. C. NUTTING.

STATE UNIVERSITY OF IOWA,
May 2, 1903.

I AM asked whether I approve or disapprove of the plan to establish a marine biological laboratory for research in the tropical Atlantic. Considered solely with reference to the good of science, it is impossible to see how any biologist could disapprove such a plan. Thus viewed, the only room for discussion would seem to be as to what the aims of such a laboratory should be. But even here it seems to me there should be little hesitation, so far, at least, as generalities are concerned. The proposed laboratory should, of course, aim to provide facilities for any investigator, at any time, to carry on any investigation for which the opportunities furnished by nature should be good. This general purpose requires no advocating, since it is essentially one that has been held by most, if not all, American marine laboratories, and hence would probably be foremost with this.

What does need urging, it seems to me, is that this new laboratory should not limit itself to this purpose. In addition to its being a laboratory where anybody can do any kind of work in which he may be interested, let it have an aim of its own, as a laboratory. Let it set for itself the task of investigating the sum total of the life and the life conditions of the area in which it shall be located. Let it undertake a biological survey of the region. This will require organized, continuous and long-continued effort.

In no American seas is there being biological work done in any way comparable with what, for example, Scandinavian and German naturalists are doing in the North and Baltic seas, and the Liverpool biological committee is doing in the Irish sea. Yet whether regarded from the strictly scientific point of view, or from the point of view of the economic interests of marine life, few aspects of biology promise surer and more important results than do investigations of this sort.

The work done by our seaside laboratories has been altogether too narrow, and the foundation of a new one in the tropical Atlantic would be a peculiarly favorable opportunity to broaden out. WM. E. RITTER.

UNIVERSITY OF CALIFORNIA,
May 3, 1903.

TO THE EDITOR OF SCIENCE: The plan to establish a marine biological laboratory in the tropical Atlantic is one of which I am heartily in favor.

Although I have never visited the Tortugas, I have received many interesting collections from there and appreciate their wealth of characteristic coral-reef fauna. At some

future time, a comparison of the fauna of this region with that of the life of similar reefs in Samoa or Tahiti would be highly instructive.

Surely there can be no place on our Atlantic coast which would give handsomer returns for such an outlay. The only objection is the relative inaccessibility of the Tortugas.

David S. Jordan.

SHORTER ARTICLES.

SOME LITTLE-KNOWN BASKET MATERIALS.

Basket collectors have been much puzzled over the identity of two materials which are extensively used by some of the California tribes. One of these forms the body surface of most of the coiled baskets made by the Indians inhabiting the lower slopes of the Sierra from Fresno River south to the Kern. These baskets are celebrated for excellence of workmanship, beauty of form, elegance of design and richness of material. The material differs in tone and texture from that used by the tribes north and south of the region indicated. When fresh its color is brownish-buff; with age it becomes darker and richer. By careful selection a handsome dappled effect is produced. The Indians told me it was the root of a marsh plant which they traveled long distances to procure. After some difficulty I succeeded in obtaining specimens, which were identified for me by Miss Alice Eastwood, botanist of the California Academy of Sciences, as *Cladium mariscus.* The coil, around which the split *Cladium* root is wound, consists of a bundle of stems of a yellow grass, *Epicampes rigens.* The black in the design is the beautiful root of the 'bracken' or 'brake fern,' *Pteridium aquilinum.* The red is usually split branches of the redbud, *Cercis occidentalis,* with the bark on, gathered after the fall rains when the bark is red. The tribes making the *Cladium* baskets are the Nims, Chukchancys, Cocahebas, Wuksaches, Wiktchumnes, Tulares and perhaps one or two others. Besides these, the root is sometimes used by certain squaws of the Mewah tribe living north of the Fresno, and by the Pakanepull and Newooah tribes living south of the Kern; but among these its use is exceptional.

Another material which has proved a stumbling block to collectors is the red of the design in the handsome baskets made by the Kern Valley, Neewooah, and Panamint Shoshone Indians. This material is often called 'cactus root,' but in my recent field work in the region where it is used I discovered that it is the unpeeled root of the tree yucca (*Yucca arborescens*). The tree yucca grows in the higher parts of the Mohave Desert, pushes over Walker Pass, and reaches down into the upper part of the valley of South Fork of Kern. The so-called Tejon Indians obtain it in Antelope Valley at the extreme west end of the Mohave Desert. The yucca root varies considerably in depth of color, so that by careful selection some of the Indian women produce beautiful shaded effects and definite pattern contrasts.

Some of the Panamint Shoshones inhabiting the desolate desert region between Owens Lake and Death Valley use, either in combination with the yucca root or independently, the bright red shafts of the wing and tail feathers of a woodpecker—the red-shafted flicker. These same Indians use two widely different materials for their black designs—the split seed pods of the devil's horn, *Martynia,* and the root of a marsh bulrush, *Scirpus.* The *Martynia* is a relatively coarse material and when properly selected yields a dead black. The *Scirpus* root is a fine delicate material which, by burying in wet ashes, is made to assume several shades or tones, from blackish-brown to purplish-black, or even lustrous black.

In parts of the Colorado Desert in southeastern California the Coahuila Indians use split strands from the leaf of the desert palm (*Neowashingtonia filamentosa*) as a surface material for their coiled baskets. The design is usually black or orange-brown and is a rush (*Juncus*).

C. Hart Merriam.

A NOTE ON PHRYNOSOMA.

In 'The Cambridge Natural History,' Vol. VIII., on 'Amphibia and Reptiles,' by Hans Gadow (London, 1901), on p. 533, regarding